

INDIAN INSTITUTE OF ASTROPHYSICS  
KODAIKANAL-3

Call No.

Acc. No. 1

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## FOREWORD.

The development of aviation in India has led to the need of two regular observations daily. In the following code which replaces the previous "Daily Weather Message Code" and the "Storm Code", provision has been made for the detailed report of cloud observations, present weather remarks, etc., to suit the needs of the aviator. The Observer should always remember that forecasts and warnings of bad weather based on the data supplied by him are telegraphed daily to the seamen, airmen, agriculturists and to the public. He will thus realise that the safety of life and property in sea, air and on land are largely dependent on the accuracy of the data supplied by him. He must therefore be sure of the accuracy and reliability of the information he is communicating in the weather telegram.

S. C. R.



## 1. SYMBOLIC FORM OF CODES.

The Observers at the Indian stations are to telegraph weather observations in the following codes :—

(a) Morning observations (8 hrs. local time)

d <sub>A</sub> d <sub>a</sub> D D F	A L N a X <sub>1</sub>
B B B T T	w w t C X <sub>2</sub>
H H V S d	W R R R X <sub>3</sub>
M M m m F'	T' T' B' B' X <sub>4</sub>
Y <sub>1</sub> Y <sub>2</sub> Y <sub>3</sub> Y <sub>4</sub> Y <sub>5</sub>	Y <sub>6</sub> Y <sub>7</sub> Y <sub>8</sub> Y <sub>9</sub> Y <sub>10</sub>

(b) Afternoon observations (17 hrs. I. S. T.)

d <sub>A</sub> d <sub>a</sub> D D F	A L N a X <sub>1</sub>
B B B T T	w w t C X <sub>2</sub>
H H V S d	W R R R X <sub>3</sub>
Y <sub>1</sub> Y <sub>2</sub> Y <sub>3</sub> Y <sub>4</sub> Y <sub>5</sub>	Y <sub>6</sub> Y <sub>7</sub> Y <sub>8</sub> Y <sub>9</sub> Y <sub>10</sub>

Special observations (see page 19), whenever called for, should be reported in code (b).

## 2. MEANINGS OF THE SYMBOLS.

d<sub>A</sub>=Direction from which low cloud of kind  
‘A’ is drifting towards station.

d<sub>a</sub>=Direction from which medium or high  
cloud of kind ‘a’ is drifting towards  
station.

DD=Direction of ground wind. (See Specification 2 and Instruction 2.)

F=Force of wind on Beaufort scale. (See Specification 3 and  
Instruction 3.)

A=Form of predominating low cloud.

a=Form of predominating medium or  
high cloud.

} (See Specification  
1 and Instruction 1.)

} (See Specification  
4 and Instruction 4.)

- $L$ =Amount of sky covered by low cloud. } (See *Specification 5* and *Instruction 5*.)  
 $N$ =Total amount of sky covered with cloud } of all forms, high, medium and low. } (See *Instruction 5*.)  
**BBB**=Barometer reading corrected for index error and temperature and reduced to latitude  $45^{\circ}$  and sea level. (See *Instruction 6*.)  
**TT**=Dry bulb thermometer reading corrected for index error.  
**T'T'**=Wet bulb thermometer reading corrected for index error.  
**MM**=Maximum thermometer reading corrected for index error.  
**mm**=Minimum thermometer reading corrected for index error.  
**ww**=Present weather remarks. (See *Specification 6* and *Instruction 8*.)  
**t**=Time of commencement of present weather phenomenon. (See *Specification 7*.)  
**C**=Additional present weather remarks regarding state of sky and evolution of cloud. (See *Specification 8*.)  
**HH**=Humidity per cent. (See *Instruction 9*.)  
**V**=Visibility. (See *Specification 9* and *Instruction 10*.)  
**S**=State of ground (Inland stations). (See *Specification 10*.)  
**S**=State of "Sea and Swell" (Coast stations). (See *Specification 11*.)  
**d**=Depth of hail or snow on ground (Inland stations). (See *Specification 12*.)  
**d**=Direction of swell (Coast stations). (See *Specification 13*.)  
**W**=Past weather remarks. (See *Specification 14*.)  
**RRR**=Rainfall. (See *Instruction 13*.)  
**F'**=Average velocity of wind during past 24 hours. (See *Specification 15*.)  
**B'B'**=Barometer corrected for index error and temperature. (See *Instruction 15*.)  
 $X_1 \ X_2 \ X_3 \ X_4$   
 $Y_1 \ Y_2 \ Y_3 \ Y_4 \ \dots \ Y_{10}$ } CHECK FIGURES. (See *Instruction 16*.)

### 3. SPECIFICATION OF THE CODE.

#### 1. Direction of cloud movement ( $d_A$ and $d_a$ ).

Code figure.

- 0 No cloud.
- 1 Cloud is coming from NE.
- 2 Cloud is coming from E.
- 3 Cloud is coming from SE.
- 4 Cloud is coming from S.
- 5 Cloud is coming from SW.
- 6 Cloud is coming from W.
- 7 Cloud is coming from NW.
- 8 Cloud is coming from N.
- 9 Cloud is apparently stationary or the direction cannot be determined.

#### 2. Direction of Ground Wind (DD).

Code figure .	00	01	02	03	04	05	06	07
Direction .	Calm	N N E	N E	E N E	E	E S E	S E	S S E

Code figure .	08	09	10	11	12	13	14	15	16
Direction .	S	S S W	S W	W S W	W	W N W	N W	N N W	N

N.B.—(i) The occurrence of *squalls* of winds within one hour of the time of observation should be indicated by the addition of 20 to the number giving wind direction. Thus, if the weather is squally at the time of observation and the direction of wind is WNW, the figure to be reported for DD is 33 and not 13.

(ii) Similarly, the occurrence of a *vigorous squall or line squall* during the past hour should be indicated by the addition of 40 to the number giving the wind direction.

(iii) The occurrence of a *continuous gale* to within one hour of the time of observation should be indicated by the addition of 60 to the number giving wind direction.

(iv) If the windvane or anemometer or both are *damaged by storm*, the fact should be intimated by the addition of 80 to the number giving wind direction.

### 3. Beaufort Scale of Wind Force (F).

Code figure.	Beau-fort No.	Description of Wind.	Limits of velocity, miles per hour.	Specification of Scale to be used when anemometer is out of order.
0	0	Calm . . .	Less than 1	Calm ; smoke rises vertically ; leaves do not move.
1	1	Light air . .	2-3	Smoke bends from the vertical and drifts slowly with wind ; windvane not affected.
2	2	Light breeze .	4-7	Wind just felt on face ; leaves rustle ; ordinary vane moved by wind.
3	3	Gentle breeze .	8-11	Leaves and small branches in constant motion.
4	4	Moderate breeze .	12-16	Raises dust and loose paper ; moves branches.
5	5	Fresh breeze .	17-21	Crested wavelets form on lakes ; trees in leaf begin to sway.
6	6	Strong breeze .	22-27	Telegraph wires whistle ; umbrellas used with difficulty.
7	7	Moderate gale .	28-33	Whole trees in motion ; inconvenience felt when walking against wind.
8	8	Fresh gale .	34-40	Breaks small branches ; difficulty experienced in walking against wind.
9	9	Strong gale .	41-48	Slight structural damage occurs, especially to roofs.
9	10	Whole gale .	49-56	Trees uprooted, considerable structural damage occurs, for instance kutch houses blown down.
	11	Storm . .	57-65	Widespread damage.
12	Hurricane . .	Above 65		....

N.B.—As the Beaufort scale of wind force extends upto 12 figures while the code provides figures only upto 9, wind forces 10, 11 and 12 on the Beaufort scale should be reported as 9 in the weather telegram with the actual force given in plain words at the end of the telegram. Thus, force 10 should be reported at the end as "Storm ten", force 11 as "Storm eleven" and force 12 as "Hurricane twelve".

#### 4. Forms of Cloud (A and a).

Code figure.	Forms.		
1	Cirrus (C)	High.	
2	Cirro-Stratus (CS)		
3	Cirro-Cumulus (CK)		
4	Alto-Cumulus (AK)	Medium.	
5	Alto-Stratus (AS)		
6	Strato-Cumulus (SK)	Low.	
7	Nimbus (N)		
8	Cumulus or Fracto-Cumulus (K or FK)		
9	Cumulo Nimbus (KN)		
0	Stratus or Fracto-Stratus (S or FS)		

#### 5. Amount of sky clouded (L and N).

Code figure.	
0	Clear sky, or overcast sky when cloud kind is reported.
1	One tenth of sky covered.
2	Two tenths of sky covered.
3	Three tenths of sky covered.
4	Four tenths of sky covered.
5	Five tenths of sky covered.
6	Six tenths of sky covered.
7	Seven tenths of sky covered.
8	Eight tenths of sky covered.
9	Nine tenths of sky covered.

**6. Present weather remarks (ww).**

*00-09. Special phenomena.*

- 00 No hydrometeor or special phenomena at the time or in the last hour.
- 01 Snow covering (practically complete).
- 02 Rotating dust or sandstorms with vertical axes (dust devils) visible from the station.
- 03 Fog over sea (coast station); or on lower ground (inland station).
- 04 Fog or mist }  
05 Dust haze                      } with visibility less than  $1\frac{1}{4}$  miles, in the  
06 Duststorm                      } last hour but not at the time.
- 07 Rime or glazed frost.
- 08 Distant lightning.
- 09 Water spouts seen.

*10-19. Precipitation other than showers in the last hour but not at time.*

- 10 Slight or moderate drizzle.
  - 11 Thick drizzle.
  - 12 Slight or moderate rain.
  - 13 Heavy rain.
  - 14 Slight or moderate snow.
  - 15 Heavy snow.
  - 16 Slight or moderate sleet.
  - 17 Heavy sleet.
  - 18 Slight or moderate thunderstorm.
  - 19 Heavy thunderstorm.
- In last hour, but not at time.

*20-29. Showers in last hour but no precipitation at the time of observation.*

- 20 Slight or moderate } Rain.
- 21 Heavy                      }
- 22 Slight or moderate } Snow.
- 23 Heavy                      }
- 24 Slight or moderate } Soft hail.
- 25 Heavy                      }
- 26 Slight or moderate } Rain and snow.
- 27 Heavy                      }
- 28 Slight or moderate } Rain and soft hail.
- 29 Heavy                      }

30-39. Fog or mist (*Visibility less than  $1\frac{1}{4}$  miles.*)

- 30 Fog or mist—sky discernible } begun within last  
 31    ,,    ,, —sky not discernible } hour.  
 32    ,,    ,, —sky discernible } has become thinner dur-  
 33    ,,    ,, —sky not discernible } ing last hour.  
 34    ,,    ,, —sky discernible } no appreciable change  
 35    ,,    ,, —sky not discernible } during last hour.  
 36    ,,    ,, —sky discernible } has become thicker dur-  
 37    ,,    ,, —sky not discernible } ing last hour.  
 38    ,,    ,, —intermittent.  
 39 Fog in patches.

## 40-49. Sand or Dust storm and Dust haze.

- 40 Dust haze, with little or no wind, has diminished in intensity during last hour.  
 41 Dust haze, with little or no wind, no appreciable change during last hour.  
 42 Dust haze, with little or no wind, has increased in intensity during last hour.  
 43 Strong winds causing dust or sand storm at station have diminished in intensity during last hour.  
 44 Strong winds causing dust ~~or~~ sand storm at station ; no appreciable change during last hour.  
 45 Strong winds causing dust or sand storm at station have increased in intensity during last hour.  
 46 Combined dust and thunder storm at station with little or no rain.  
 47 Duststorm visible from station, with thunder heard.  
 48 Line of dust or sand storms (haboob or line squall) visible from station but not at it.  
 49 Line of dust or sand storms (haboob or line squall) affecting station itself.
- Visibility less than  $1\frac{1}{4}$  miles.

**50-99. Precipitation at the time of observation.**

**50-59. Drizzle** (*Precipitation consisting of numerous minute drops*).

50	Intermittent	} slight drizzle.
51	Continuous	
52	Intermittent	} moderate drizzle.
53	Continuous	
54	Intermittent	} thick drizzle.
55	Continuous	
56	Slight or moderate	} drizzle and fog.
57	Thick	
58	Slight or moderate	} drizzle and rain.
59	Thick	

**60-69. Rain.**

60	Intermittent	} slight rain.
61	Continuous	
62	Intermittent	} moderate rain.
63	Continuous	
64	Intermittent	} heavy rain.
65	Continuous	
66	Slight or moderate	} rain and fog.
67	Heavy	
68	Slight or moderate	} rain and snow.
69	Heavy	

**70-79. Snow.**

70	Intermittent	} slight snow in flakes.
71	Continuous	
72	Intermittent	} moderate snow in flakes.
73	Continuous	
74	Intermittent	} heavy snow in flakes.
75	Continuous	
76	Slight or moderate	} snow and fog.
77	Heavy	
78	Granular snow.	
79	Ice crystals.	

## 80-89. Showers.

- |    |                               |                       |
|----|-------------------------------|-----------------------|
| 80 | Showers of slight or moderate | } rain.               |
| 81 | „ heavy                       |                       |
| 82 | „ slight or moderate          | } snow.               |
| 83 | „ heavy                       |                       |
| 84 | „ slight or moderate          | } soft hail.          |
| 85 | „ heavy                       |                       |
| 86 | „ slight or moderate          | } rain and snow.      |
| 87 | „ heavy                       |                       |
| 88 | „ slight or moderate          | } rain and soft hail. |
| 89 | „ heavy                       |                       |

## 90-99. Thunderstorm.

- |    |  |  |
|----|--|--|
| 90 | Slight without hail, but with rain (or snow)   | } at time of observation.  |
| 91 | Slight with soft hail                          |  |
| 92 | Moderate without hail, but with rain (or snow) |  |
| 93 | Moderate with soft hail                        |  |
| 94 | Heavy without hail, but with rain (or snow)    |  |
| 95 | Heavy with soft hail                           |  |
| 96 | Heavy with hail                                | } thunderstorm during last hour, but not at time of observation. |
| 97 | Rain at time of observation                    |  |
| 98 | Snow or sleet at time of observation           |  |
| 99 | Soft hail at time of observation               |  |

## 7. Time of commencement of Present Weather Phenomenon (t).

## Code

## figure.

- |   |   |
|---|---|
| 0 | No hydrometeor or special phenomena.      |
| 1 | 0 to 1 hour before time of observation.   |
| 2 | 1 to 2 hours before time of observation.  |
| 3 | 2 to 3 hours before time of observation.  |
| 4 | 3 to 4 hours before time of observation.  |
| 5 | 4 to 5 hours before time of observation.  |
| 6 | 5 to 6 hours before time of observation.  |
| 7 | 6 to 7 hours before time of observation.  |
| 8 | 8 to 10 hours before time of observation. |
| 9 | Above 10 hours.                           |

**8. Additional Present Weather Remarks regarding State of Sky and Evolution of Cloud (C).**

- 0 *No additional remark.*
- 1 *Fine weather*: Sky cloudless, or with fine isolated cirrus floating on blue sky and showing signs of dissolving; or with clouds of stratiform type at one and the same level, but with no cloud of cumuliform origin.
- 2 *Fair weather*: Sky with fine and distinct cirrus covering a considerable part of the sky but not increasing or forming a continuous layer; or sky with 'fair weather cumulus' with characteristic *diurnal variation*.
- 3 *Unsettled weather*: Sky with alto-cumulus and alto-stratus cloud evolved by the thickening of cirrus through the intermediate stages of cirro-stratus and cirro-cumulus but not originated by the thinning of cumulus or cumulo-nimbus.
- 4 *Changeable weather*: Characterised by rapid alterations of threatening sky (large cumulus or cumulo-nimbus) and marked clearings.
- 5 *General bad weather*: Sky covered with a thick veil of alto-stratus and nimbus and showing no sign of improvement.
- 6 *Thundery sky* with threatening thunder clouds (alto-cumulus, cumulus and cumulo-nimbus) but no lightning seen or thunder heard.
- 7 *Thunder heard without rain at station.*
- 8 *Heavy roll of thunder and lightning* with appearance of the sky as though it may rain shortly.
- 9 *Weather looks stormy* in the neighbourhood.

## 9. Visibility (V).

Code  
figure.

- 0 Objects not visible at 55 yds. (Dense fog or dense duststorm.)
- 1 Objects not visible at 220 yds. (Thick fog or thick duststorm.)
- 2 Objects not visible at 550 yds. (Moderate fog or moderate duststorm or thick dust haze.)
- 3 Objects not visible at 1,100 yds. (Light fog or light duststorm or moderate dust haze.)
- 4 Objects not visible at  $1\frac{1}{4}$  miles. (Mist or slight dust haze, very poor visibility.)
- 5 Objects not visible at  $2\frac{1}{2}$  miles. (Poor visibility.)
- 6 Objects not visible at  $6\frac{1}{4}$  miles. (Moderate visibility.)
- 7 Objects not visible at  $12\frac{1}{2}$  miles. (Good visibility.)
- 8 Objects not visible at 31 miles. (Very good visibility.)
- 9 Objects visible at 31 miles or more. (Excellent visibility.)

N.B.— Stations not reporting visibility will give 0 in this square.

**10. State of Ground (S) (Inland Stations).**

- 0 Dry ground.
- 1 Dew (Wet grass but not wet ground).
- 2 Wet ground.
- 3 Soft wet ground (Muddy).
- 4 Slight flood in the neighbourhood.
- 5 Moderate flood in the neighbourhood.
- 6 Severe flood in the neighbourhood.
- 7 Ground frozen (Frost).
- 8 Ground covered by thin layer of hail or snow.
- 9 Ground covered by moderate or thick layer of hail or snow.

**11. State of Sea and Swell (S) (Coast Stations).**

- 0 Sea not visible.
  - 1 No swell
  - 2 Moderate swell
  - 3 Heavy swell
  - 4 No swell
  - 5 Moderate swell
  - 6 Heavy swell
  - 7 Rough sea.
  - 8 Very rough sea.
  - 9 Mountainous sea.
- } Calm or slight sea.  
} Moderate sea.

**12. Depth of Hail or Snow  
on Ground (d) (Inland  
Stations).**

- 0 No hail or snow.
- 1 Less than 1 inch.
- 2 Less than 2 inches.
- 3 Less than 3 inches.
- 4 Less than 4 inches.
- 5 Less than 5 inches.
- 6 Less than 6 inches.
- 7 Less than 1 foot.
- 8 Less than 2 feet.
- 9 More than 2 feet.

**13. Direction of Swell (d)  
(Coast Stations).**

- |   |                 |
|---|-----------------|
| 0 | No swell.       |
| 1 | NE.             |
| 2 | E.              |
| 3 | SE.             |
| 4 | S.              |
| 5 | SW.             |
| 6 | W.              |
| 7 | NW.             |
| 8 | N.              |
| 9 | Confused swell. |

## 14. Past Weather Remarks (W).

Code  
figure.

- |   |                                     |   |
|---|-------------------------------------|---|
| 0 | No remark. (Clear or variable sky.) |   |
| 1 | Mainly overcast.                    |   |
| 2 | Squally weather.                    |   |
| 3 | Fog or mist.                        | } Visibility less than $1\frac{1}{4}$<br>miles. |
| 4 | Duststorm or dust haze.             |   |
| 5 | Showers.                            |   |
| 6 | Rain or drizzle.                    |   |
| 7 | Snow or sleet.                      |   |
| 8 | Thunder with or without rain.       |   |
| 9 | Hail.                               |   |

## 15. Average velocity of wind during past 24 hours (F').

Code  
figure.

Velocity in miles per hour.

- |   |                          |
|---|--------------------------|
| 0 | Anemometer out of order. |
| 1 | 0 to 1.                  |
| 2 | 2 to 4.                  |
| 3 | 5 to 7.                  |
| 4 | 8 to 10.                 |
| 5 | 11 to 13.                |
| 6 | 14 to 16.                |
| 7 | 17 to 19.                |
| 8 | 20 to 22.                |
| 9 | 23 or above.             |

N.B.-- If the average velocity during the past 24 hours is above 23 miles per hour, report figure 9 and give the *actual velocity in plain words* at the end of the weather telegram. For example, if the average velocity is 29 miles per hour report 9 and add at the end of the telegram "average velocity twenty-nine".

#### 4. INSTRUCTIONS FOR PREPARATION OF WEATHER TELEGRAMS.

1. Direction of cloud movement  $d_A$  and  $d_a$ : See columns 24 and 27 of the *Pocket Register* and the *code specification 1*.
2. Direction of Ground Wind DD : See column 16 of the *Pocket Register* and the *code specification 2*.
3. Wind force F (Beaufort scale): See column 19 of the *Pocket Register* and the *code specification 3*.
4. Cloud forms A and a : See columns 23 and 26 of the *Pocket Register* and the *code specification 4*. If more than one form of low clouds (Nos. 6-10) are present, report for "A" the form of low cloud whose amount is the largest. Similarly if more than one form of medium or high clouds (Nos. 1-5) are present, report for "a" the form of medium or high cloud whose amount is the greatest. Telegraph 0 for "A" if low cloud is absent and 0 for "a" when there is no medium or high cloud.
5. Cloud amount L and N : See columns 22 and 28 of the *Pocket Register* and the *code specification 5*. Report for "L" the amount of low cloud of all forms present in the sky. If low cloud is absent report 0 for "L". "N" represents the total amount of sky covered with cloud irrespective of forms or height, i.e., the sum of the amounts of low and medium or high clouds present in the sky. If the sky is cloudless report 0 for "N".
6. Barometer BBB : See column 6 of the *Pocket Register* where the barometer reading is entered after correction for index error and temperature, and reduction to latitude  $45^{\circ}$  and sea level. The entry consists of 5 figures, two integers and three decimals, such as 29.785, 30.235, 29.634, 30.147 etc. The first integral figure which is always "2" or "3" is to be omitted from the telegraphic report. Also in the weather telegram the barometer is required correct only

to two places of decimal. Neglect the third decimal figure if it is below "5" and add one to the second decimal figure if the third one is more than "5". When the third decimal figure is "5" neglect it if the second decimal figure is an *odd* number but add one if it is *even*. Thus, in the foregoing examples, the figures which are to be reported in the weather telegram for BBB are 979, 023, 963 and 015 respectively.

*N.B.*—If the barometer is defective or cannot be read for any other reason report "000" for BBB and "00" for B'B'.

**7. Thermometers, Dry bulb (TT), Wet bulb (T'T'), Maximum (MM) and Minimum (mm) :** See columns 11, 12, 13 and 14 of the *Pocket Register*. In the weather telegram the *corrected* readings are to be reported to the nearest whole degree. If the reading falls midway between two whole numbers the nearest odd number should be telegraphed. Thus, if the dry bulb temperature (with index correction applied) were 68.5° the appropriate figure which should be telegraphed would be 69, but if the reading were 67.5° the appropriate figure would be 67. When any temperature of 100° or over is to be reported omit 1 and give the other two figures. Thus, if the maximum temperature (after index correction applied) were 105.8° telegraph 06.

*N.B.*—If a thermometer is out of order or cannot be read for any reason, telegraph 00 in the space provided for it and add at the end of the telegram the word "Dry bulb", "Wet bulb", "Maximum" or "Minimum" as the case may be.

**8. Present Weather Remarks ww, t and C :** See column 34 of the *Pocket Register* and the *code specifications 6, 7 and 8*. For "ww" always report the largest number of the code specification 6 which applies to the weather at the station within one hour of the time of observation. For example, suppose that it is raining at the time of observation without thunder or lightning at the moment but that a thunderstorm occurred during the past hour, the appropriate figure which should be reported in this case is 97

and not any of the figures 60-69. Again, if there were fog in the past hour continuing upto the time of observation, the appropriate number is not 03 or 04 but it should be chosen from the group 30-39.

Whatever phenomenon (drizzle, rain, snow, showers, fog, dust-storm, dust haze, thunderstorm, lightning etc.) is reported in "ww", its time of commencement must always be telegraphed according to the specification 7. The code for "C" specifies the weather in general terms (fine, fair, unsettled, variable etc.), as judged from the appearance of the sky and the development in cloud. The code figure 0 (no additional present weather remarks) should be used only on special occasions, when the observer finds it difficult to judge the weather situation from the state of the sky and the evolution of cloud. It is hoped that an experienced observer will not need to use this figure.

**9. Humidity HH :** See column 15 of the *Pocket Register*.

*N.B.*—If the dry bulb or wet bulb thermometer or both are out of order or cannot be read for any other reason, report 00 for HH.

**10. Visibility V :** See column 21 of the *Pocket Register* and the *code specification 9*.

*N.B.*—Stations not reporting visibility will always telegraph 0 for V.

**11. State of Ground or Sea S and d :** See columns 31 and 32 of the *Pocket Register* and the *code specifications 10, 11, 12 and 13*. Coast stations, wherever possible, will report the state of sea and the direction of swell; other stations will report the state of ground and the depth of hail or snow on the ground.

**12. Past Weather Remarks W :** See column 33 of the *Pocket Register* and the *code specification 14*.

**13. Rainfall RRR :** See columns 29 and 30 of the *Pocket Register*. In the *morning* (8 hrs. local time) weather telegram give the total rainfall during past 24 hours (column 30) but in

the *afternoon* (17 hrs. I. S. T.) and all *special observations* weather telegrams report the *amount of rainfall since last observation* (column 29). Telegraph two cents as 002 in the space for RRR ; seventyfive cents as 075 ; three inches and sixtythree cents as 363 ; and so on upto nine inches and ninetynine cents as 999. Also telegraph 999 for RRR when the rainfall is ten inches or more and give at the end of the telegram the actual amount in plain words such as " Rainfall fifteen inches twentyone cents ".

*N.B.*—Report 000 for RRR if there is no rainfall and also when the Rain-gauge is out of order or rainfall cannot be measured for any reason. In the latter case, add at the end of the telegram " raingauge out of order " or " rainfall not measured ".

14. **Average Wind Velocity during past 24 hours F'** : See column 20 of the *Pocket Register* and the *code specification 15*.
15. See column 5 of the Pocket Register where barometer reading is entered after correction for index error and temperature. The entry consists of five figures, two integers and three decimals, such as 29.582, 29.455, 30.118 etc. Corrected to two places of decimals these readings are 29.58, 29.45, 30.12 etc. (See Instruction 6.) For B'B' report only the *two decimal figures*. Thus in the foregoing examples, the figures which are to be reported in the weather telegram for B'B' are 58, 45 and 12 respectively.
16. **Check figures  $\mathbf{X}_1, \mathbf{X}_2, \mathbf{X}_3, \mathbf{X}_4$  and  $\mathbf{Y}_1, \mathbf{Y}_2, \mathbf{Y}_3, \dots, \mathbf{Y}_{10}$**  : After all the observations have been entered in the weather telegram, only the spaces for the checks remain to be filled up. Add up in rows and columns and give units digits in the corresponding Check squares, that is, if the sum is 23, neglect 2 and give 3 ; if the sum is 7, give 7. When all columns and rows have been added, only the " Key Check " square  $\mathbf{Y}_{10}$  is left unfilled. In a correctly worked telegram the sum of the check column ( $\mathbf{X}_1 + \mathbf{X}_2 + \mathbf{X}_3 + \mathbf{X}_4$ ) and the sum of the check row ( $\mathbf{Y}_1 + \mathbf{Y}_2 + \mathbf{Y}_3 + \dots + \mathbf{Y}_9$ ) will have the same units digit ; enter this figure in the key

check square  $Y_{10}$ . Always make sure that the key check really holds both for the check row and the check column.

17. General : Weather telegrams must always be prepared in the telegram form supplied by this department. The right-hand half of this form is ruled into squares and the observer should take care to put down the figures in proper sequence. The observer should always consult the *Guide Card* which illustrates the method of preparing the weather telegram from the *Pocket Register*.

Always make carbon copy of the telegrams. Send the top one to the telegraph office and forward the carbon copy to this Department along with the *Monthly Meteorological Register and Weather Diary*.

## REQUISITION FOR SPECIAL OBSERVATIONS.

The two regular hours of observations are 8 A.M. local time and 17 hrs. I. S. T. In addition the observers may be required occasionally to take extra observations on the receipt of orders from either "Weather, Poona", or "Meteorologist, Karachi", or "Weather, Delhi" or "Weather, Calcutta". The requisitions will generally be made in special code words.

There are two code words which signify to the observer the class by which he is to telegraph the extra set of observations. These words are :—

"LIGHTNING" meaning "class special observations telegram *XXW—Storm*".

"EXPRESS" meaning "class special observations telegram *XW*".

The *time* at which the observer is to take the extra set of observations is indicated by the following code words :—

Code word.	Time of observation.	Code word.	Time of observation.
Accordion . . .	1 hr. I. S. T. .	Maltreat . . .	13 hrs. I. S. T. .
Bannock . . .	2 hrs. , , .	Negotiate . . .	14 hrs. , ,
Compensate . . .	3 hrs. , , .	Onlooker . . .	15 hrs. , ,
Definite . . .	4 hrs. , , .	Pastime . . .	16 hrs. , ,
Encounter . . .	5 hrs. , , .	Quotation . . .	17 hrs. , ,
Formidable . . .	6 hrs. , , .	Recitation . . .	18 hrs. , ,
Gorgeous . . .	7 hrs. , , .	Sisterhood . . .	19 hrs. , ,
Humility . . .	8 hrs. , , .	Tournament . . .	20 hrs. , ,
Imperial . . .	9 hrs. , , .	Untimely . . .	21 hrs. , ,
Jocular . . .	10 hrs. , , .	Vagabond . . .	22 hrs. , ,
Kinsman . . .	11 hrs. , , .	Wilderness . . .	23 hrs. , ,
Lantern . . .	12 hrs. , , .	Xylonite . . .	24 hrs. , ,

Yarrow—and then further observations at intervals of 1 hr. until further orders.

Yearling—and then further observations at intervals of 2 hrs. until further orders.

Yield—and then further observations at intervals of 3 hrs.  
until further orders.

Zealot—and then further observations at intervals of 4 hrs.  
until further orders.

Zigzag—and then further observations at intervals of 6 hrs.  
until further orders.

Zodiac—and then further observations at intervals of 8 hrs.  
until further orders.

Below are given 3 examples of telegrams calling for special observations :—

TELEGRAM.	EXPLANATION.
I. To Weather, Cawnpore. " Express From Weather, Weather, Delhi. Bannock " Weather.	Cawnpore is to take an extra set of observations at 2 hrs. I. S. T. and despatch to Delhi the coded weather telegram classed " XW ".
II. To Weather, Masulipatam. " Lightning Negotiate From Weather, Weather, Calcutta. Tournamen- Bannock " Weather.	Masulipatam is to take extra observations at 14 hrs., 20 hrs. and 2 hrs. I. S. T. and wire to Calcutta each set as soon as taken, classing the telegram " XXW—Storm ".
III. To Weather, Pamban. " Lightning Negotiate From Weather, Weather, Poona. Zigzag " Weather.	Pamban is to take extra observations at 14 hrs. I. S. T., telegraph these to Poona classed " XXW—Storm " and also take special observations every 6 hours until further orders from Poona and wire them similarly classed " XXW—Storm ".

N.B.—Each telegram requisitioning or discontinuing special observations refers only to the meteorological centre from which it is sent. Thus, if Delhi asks for special observations from Cawnpore, the extra observations are to be telegraphed only to Delhi and not to the other meteorological centres to which Cawnpore sends regular morning and afternoon observations. Again, if Pamban has received orders for extra observations from both Calcutta and Poona, Pamban must not discontinue sending special observations to Calcutta because Poona wires " stop special observations ". A message from Poona applies to Poona only, and a message from Calcutta to Calcutta only.

